

Application No.: 9/425,636

Case No.: 55197US002

Remarks

Applicant is hereby amending Claim 1 to limit the curing of the hydrophilic matrix of the hydrogel microbeads to chemical means only (by deleting the recitation of non-chemical means).

Claims 1 – 32 were originally filed. Claims 1 and 4 were previously amended. Claims 11 and 19-32 were previously canceled. Claim 9 has been withdrawn as a non-elected claim, but Claims 9 should be rejoined upon a determination that a generic claim is allowable.

Rejection Under 35 U.S.C. Section 103

Claims 1-8, 10, and 12 -18 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Akashi et al. (U.S. Patent No. 5,686,385). The rejection is respectfully traversed for the following reasons.

Akashi et al. address the problem of decomposition of agricultural active ingredients by microencapsulating the active ingredients with water-soluble materials (see, for example, column 3, line 59, through column 4, line 3). The microcapsules are prepared by (1) preparing an aqueous solution, suspension, or emulsion of the active ingredient and water-soluble coating material, and (2) drying the resulting solution, suspension, or emulsion by suction drying or spray drying (see, for example, column 8, line 12, through column 9, line 12). The resulting product thus appears to be a dry powder that is said to have excellent storage stability and to be easy to handle (see, for example, column 12, lines 27-56).

The Examiner has noted that the Akashi microcapsules can be used as a “water-dispersible powder” and has asserted that “[i]t would have been obvious to one of ordinary skill in the art at the time the invention was made to deliver a dispersion of alginate microcapsules containing pheromones to achieve the beneficial effect of handling and improving physical properties in view of Akashi et al.” Applicant respectfully submits, however, that the microcapsules of Akashi are actually quite different from Applicant’s microbeads and, furthermore, that Akashi actually teaches away from the instant invention for the following reasons.

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The Examiner has overlooked the fact that Applicant's claims recite the term "hydrogel." Applicant's method involves the use of a suspension of microbeads that are prepared in a manner that provides hydrogel (or water-containing gel) microbeads. Such microbeads comprise a three-dimensional polymeric network that can imbibe water without the loss of shape and mechanical strength (see the previously submitted copy of a description of hydrogels from the Encyclopedia of Polymer Science and Engineering, Volume 7, page 783, John Wiley & Sons, New York (1987)). As explained, for example, at page 15 of Applicant's specification, Applicant's preparation process includes a hardening or curing step that involves the formation of polymer crosslinks.

The resulting hydrogel microbeads "swell" under humid conditions and shrink under dry conditions, and Applicant has discovered that this characteristic can be used to control the release of active material from the microbead. As explained at page 3, lines 1-4, of Applicant's specification, "the microbeads are capable of re-hydrating after an initial dehydration and release of active. Thus, the release and longevity of the active can be controlled by adjusting the humidity of the environment in which the microbeads have been delivered."

In contrast, Akashi does not appear to teach or suggest a hardening or curing step, but rather teaches a drying step that is used to remove water and form a dry powder. The Examiner is correct that the resulting powder is said to be dispersible in water, but, due to the absence of a three-dimensional polymeric network, it would tend to at least partially dissolve and, after application to a field, would not cyclically dehydrate and rehydrate without loss of shape or mechanical strength.

Furthermore, Akashi actually teaches away from hydrogel formation by stating, for example, that "[g]enerally, the exit-temperature [of the spray-dryer] should be not less than 100°C in order to avoid an adverse effect in that residual water in the obtained microcapsules may have a bad influence on stability of an active ingredient" (see column 9, lines 9-13). This statement hardly suggests to one skilled in the art that a water-containing gel would be advantageous.

Thus, Applicant still believes that the term "hydrogel" in Claim 1 is sufficient to patentably distinguish over Akashi. In order to advance prosecution, however, Applicant is

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further amending Claim 1 to limit the curing of the hydrophilic matrix to the use of chemical means. Akashi does not appear to teach or suggest the use of chemical curing to form a chemically crosslinked polymer network.

Rather, Akashi's express intent is drying. Akashi actually teaches away from hydrogel formation by expressing a preference for high drying temperatures. Applicant therefore respectfully submits that the instant claims are indeed unobvious and patentable over Akashi and respectfully requests that the rejection under Section 103 be withdrawn.

Concluding Remarks

Reconsideration and allowance of Applicant's claims are respectfully requested.

Respectfully submitted,

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Date

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